EFFECT OF L-ASCORBIC ACID ON THE FLAVOR STABILITY OF CONCENTRATED SWEETENED CREAM

In an earlier paper (1) it was shown that adequate deaeration improves the flavor stability of concentrated sweetened cream during storage for six months at 40 to 70 F. The effect of L-ascorbic acid on the flavor of dairy products has been reviewed recently (2). The present paper presents information on the relative effectiveness of L-ascorbic acid (vitamin C) in stabilizing the flavor of this product at various temperatures.

Preparation of concentrated sweetened cream. Milk was held 15 sec at 170 F in a Mallory tubular heater,[1] cooled to 130 to 135 F and separated. The cream was standardized to 65% fat. On blending 100 lb of this cream, 52 lb of sucrose and 10 lb of low heat nonfat dry milk, concentrated sweetened cream containing approximately 40% fat, 32% sucrose, 20% water, and 8% milk solids-not-fat was obtained.

L-ascorbic acid, as a concentrated water solution, was added to the concentrated sweetened cream before the latter was heated to 200 F for 15 sec.

Deaeration was accomplished by delivering the pasteurization blend at 155 F to a chamber under 29 inches of vacuum and holding the material at least 50 min.

The product was canned at atmospheric pressure with precaution against air contamination.

Flavor scoring was carried out as described previously (1), and by the same taste panel.

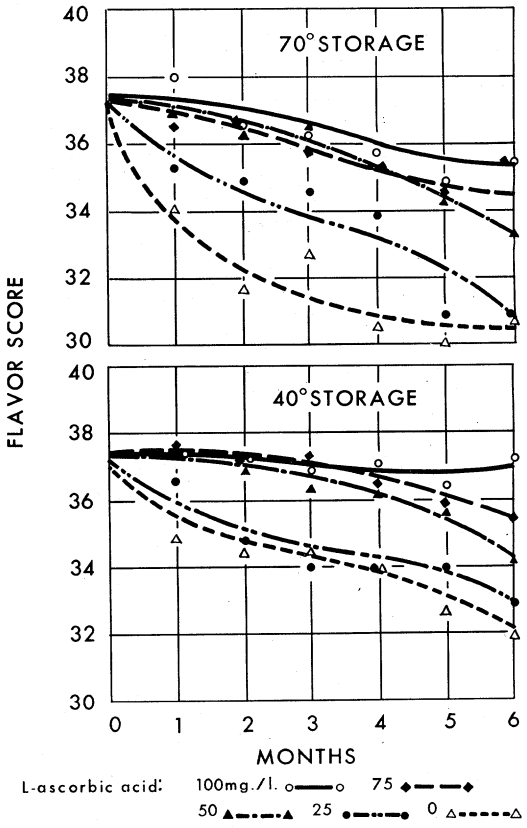

FIG. 1. Effect of adding L-ascorbic acid to concentrated sweetened cream on its flavor score during storage at 40 and 70 F.

[1] The use of trade names is for the purpose of identification only, and does not imply endorsement of the product or its manufacturer by the U. S. Department of Agriculture.

RESULTS AND DISCUSSION

The addition of 50 mg of L-ascorbic acid per liter of nondeaerated concentrated sweetened cream had a much greater effect on flavor stability than did 25 mg, and nearly as much as 100 mg, during the first three months of storage. After that time the flavor scores of the samples containing the larger amounts were higher (Figure 1).

L-ascorbic acid at the rate of 100 mg per liter of nondeaerated product substantially improved the flavor stability at all storage temperatures (Figure 2).

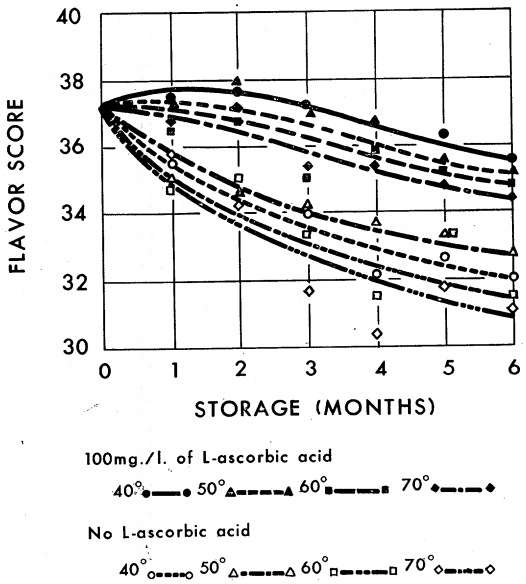

FIG. 2. Effect of adding L-ascorbic acid to concentrated sweetened cream at the rate of 100 mg per liter on its flavor score during storage at 40, 50, 60, and 70 F.

Deaeration in direct comparison with L-ascorbic acid at the 100 mg per liter level gave somewhat better results and a combination of the two was most effective in improving flavor stability at 40 and 70 F, as shown in Figure 3.

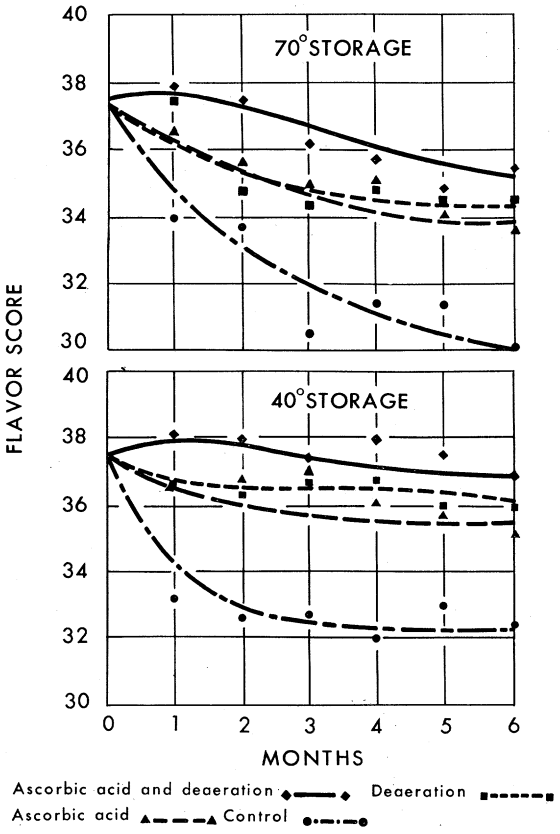

FIG. 3. Effects of adding L-ascorbic acid (100 mg/liter), deaerating, and both on the flavor score of concentrated sweetened cream during storage at 40 and 70 F.

The flavor scores of different experiments did not agree precisely. However, there was general agreement and definite patterns were clearly evident as shown by the average scores of two or more experiments presented in the figures.

The addition of L-ascorbic acid to concentrated sweetened cream lowers its Eh and thus produces a medium which is more resistant to oxidation. Furthermore, L-ascorbic acid, being easily oxidized, reacts with the oxygen in the product and inhibits changes which lower the flavor score. In this sense it may be considered to be a flavor stabilizer and to have a beneficial effect comparable to deaeration.

The addition of L-ascorbic acid to concentrated sweetened cream is a potential alternative to deaeration in stabilizing the flavor for about three months. Deaeration was more effective than L-ascorbic acid in stabilizing the flavor for six months. Best results were obtained when concentrated sweetened cream was fortified with L-ascorbic acid and deaerated.

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(2) KRUKOVSKY, V. N. Quality and Flavor of Dairy Products, Review of Biochemical Properties of Milk and the Lipide Deterioration in Milk and Milk Products as Influenced by Natural Varietal Factors. J. Agr. Food Chem., 9: 439. 1961.